

Notice of Allowability

Application No.

09/879,210

Examiner

Jeffrey R. West

Applicant(s)

KOURITZIN ET AL.

Art Unit

2857

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the Response filed 13 May 2004.
2. ☒ The allowed claim(s) is/are 1-7.
3. ☒ The drawings filed on 13 June 2001 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

DETAILED ACTION

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.
2. Authorization for this examiner's amendment was given in a telephone interview with Mr. Kevin Cyr on June 09, 2004.
3. The application has been amended as follows:
 - In claim 1, line 2, "for the current" has been changed to ---for a current---
 - In claim 1, line 4, "with the state" has been changed to ---with a state---
 - In claim 1, line 10, "state data of said particle's data" has been changed to ---state data of said particles---
 - In claim 1, line 12, "state data of particles of said sampled data" has been changed to ---state data of said particles---
 - In claim 1, line 14, "branching value calculations" has been changed to ---branching value criteria---
 - In claim 1, line 16, "branching values" has been changed to ---branching value criteria---

In claim 1, line 18, "dividing the collection" has been changed to ---dividing a collection---.

In claim 1, line 21, "base" has been changed to ---based---.

In claim 4, line 2, "tat" has been changed to ---that---.

In claim 5, line 2, "sate" has been changed to ---state---.

In claim 5, line 8, "ancestral particles" has been changed to ---ancestral particle---

In claim 5, line 11, "as" has been changed to ---has---.

Allowable Subject Matter

4. Claims 1-7 are considered to be allowable over the cited prior art for the following reasons:

U.S. Patent No. 5,933,352 to Salut discloses a method and a system for non-linear optimal estimation of dynamic processes in real time comprising providing measurement sensing of sampled data associated with the state of a signal process at a sampled instant of time under consideration, creating state data for particles that probabilistically resemble the state of said signal process, and repeatedly computing estimates of a conditional probability distribution based upon the arrival of new sampled data at subsequent sampled instants of time (column 5, lines 13-26 and 60-65). Salut also discloses calculating scalar magnitude weights, based upon weight values at a preceding (i.e. ancestral) instant, representing the probability that the components are those of the current state of the dynamic process to be estimated,

and the past, current, and future/possible paths, (column 1, lines 25-32), all of which taking into account the probability of noise disturbing the measurements (column 5, lines 29-39 and 46-52). Salut also discloses generating intermediate ancestor state data at specific selected instances in time in order to facilitate the calculation of asymptotically optimal smoothing filters (column 7, lines 43-54) as well as discarding the ancestor state data when the most recent measurement time is greater than a defined span of time from the creation of a given ancestor particle (i.e. the particle falls outside a predetermined time window) (column 7, lines 55-56).

Also noted are the following newly cited references:

U.S. Patent No. 5,953,383 to Kojima teaches a diversity receiver including means for calculating branch metrics and differential detection signals, multiplying the branch metric values with respect to the differential detection signals to enhance the signal-to-noise ratio, and means for applying a weighting factor of zero for pure noise branch metrics in order to remove a term comprising only noise.

U.S. Patent No. 6,452,979 to Ariel et al. teaches a soft output decoder for convolutional codes including recursion techniques using branch metrics.

U.S. Patent No. 6,333,954 to Hansquine teaches high-speed ACS for Viterbi decoder implementations including calculating branch metrics that represent the conditional probability that the transition from a particular source state to a particular target state occurred.

U.S. Patent No. 6,104,765 to Fredrickson teaches asymmetric channel data detection compensation including determining a summation of branch metrics to form a path metric.

U.S. Patent No. 6,005,897 to McCallister et al. teaches a data communication system and method therefore including the determination of likelihood values which are selectively duplicated.

U.S. Patent No. 4,802,174 to Hiraiwa et al. teaches a Viterbi decoder with detection of synchronous or asynchronous states including the normalization of branch metrics and the corresponding affect on a signal to noise ratio based on such normalization.

U.S. Patent No. 6,226,409 to Cham et al. teaches multiple mode probability density estimation with application to sequential Markovian decision processes.

As noted above, the cited prior art teaches many of the features of the claimed invention, however none of the cited prior art teaches or suggests, in combination with the other claimed limitations for estimating a conditional probability distribution for a current and future state of a non-linear random dynamic signal process, calculating branching values each of a plurality of particles of state data at each new instant of time, selectively duplicating the state data of said particles in accordance with branching value criteria, selectively deleting the state data of said particles in accordance with branching value criteria, and undertaking in accordance with said branching value criteria: scaling said branching value criteria with measurement

noise so as to reduce duplications and deletions of state data as the effect of the measurement noise increase, dividing a collection of said particle state data by the number of particles to provide an estimate of a conditional probability distribution of said signal process at the time of the most recent measurement, and repeatedly computing estimates of said conditional probability distribution based upon the arrival of new sampled data, provided by sensors, at subsequent sampled instants of time.

5. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."


6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey R. West whose telephone number is (571)272-2226. The examiner can normally be reached on Monday through Friday, 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on (571)272-2216. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jrw
June 10, 2004


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